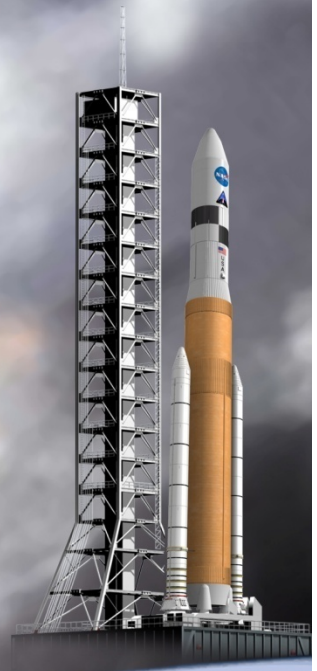
The Evolution of Web-Based Collaboration at NASA & The Wiki-way Forward



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ARES Corporation
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Exploration Systems Mission Directorate
NASA Headquarters

Connect & Discover Theme

Web-Based Collaboration

Now An Essential Enabling Capability For Successful Program Management & Systems Engineering

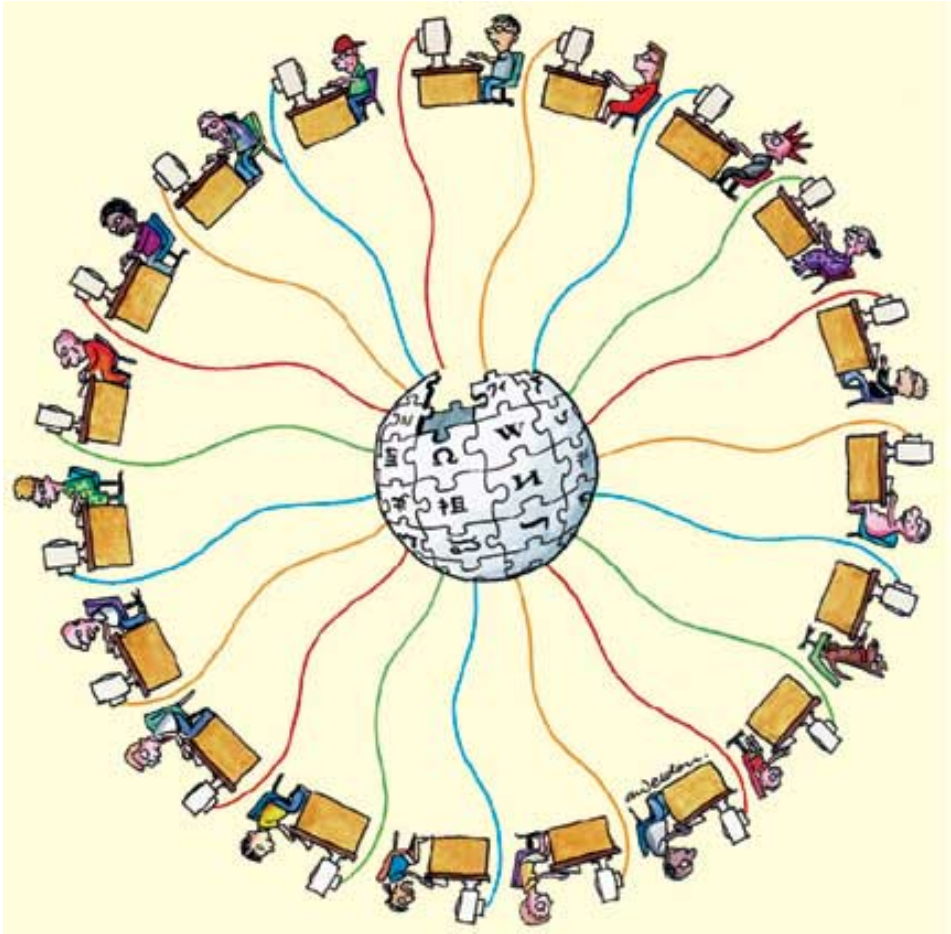

Illustration: *Andrew Weldon*

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Large Scale Web-Based Collaboration at NASA

PBMA KM Program- Brief History

- **1999 PBMA Concept / Req Definition**
- **2000 PBMA Implementation**
- **2001 1st Web-Based Collaboration Functionality (Home built Knowledge Information Center (KIC)**
- **2002 PBMA incorporates Intranets CoP Engine – Work Groups Take Off**
- **2003 Columbia Lost / PBMA Supports CAIB and Return to Flight Task Force (Intranets Engine moved behind NASA firewalls)**
- **2003 PBMA introduces Secure Web Meeting**
- **2004 PBMA shift from Intranets to Community Zero Secure CoP Engine**
- **2005 PBMA first EA-Certified KMS at NASA**
- **2008 PBMA program management shifts from NASA Review & Assessment Division to NASA Safety Center**

- **Approx 750 Communities**
- **Aprox 13,000 CoP users**
- **4,500 Registered Secure Meeting users**

Community of Practice Time-line

CoPs Remain Important – Future Innovations Anticipated Along The Wiki-Way Path Forward

IRKM Program Brief History

- **2006 IRKM Implemented**
- **Confluence Wiki Engine provided within ESMD ICE environment**
- **2007 Wiki Training introduced – MSFC, KSC, JSC, HQ**

- **Approx 329 Wikis**
- **72% Active (239)**
- **Over 4,000 Active Users**

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ESMD Integrated Risk & Knowledge Management (IRKM) Program

- ***Risk Management***
  - ***Knowledge Based Risks***
- ***Knowledge Management***
  - ***Web-Based Collaboration***
  - ***Work Team Support***
  - ***Organizational Learning***

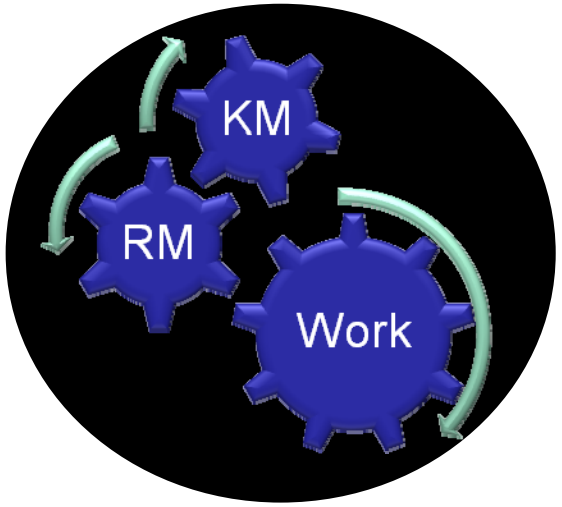
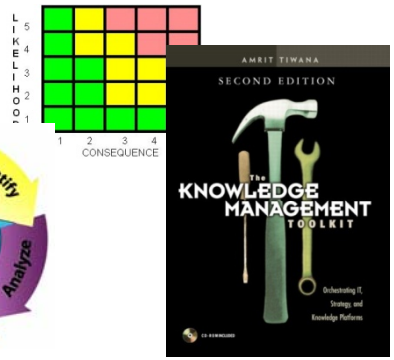


Illustration: *JS Newman*

IRKM Merges
Core Systems Engineering
Processes with
Work Enabling RM & KM Concepts



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IRKM-Program / Key Elements & Supporting Technologies

ESMD Integrated Risk & Knowledge Management Program	
Function	Activity & Supporting Technology
Risk Management	Knowledge-Based Risks (KBRs) – Portal-based Risk Wizard - Wiki-based ESMD Risk Data Base: ARM CxP Risk Data Base: IRMA
Web-Based Collaboration	Wiki Spaces PBMA Communities of Practice Think Tank
Work Team Face-To-Face Process Support	Process 2.0 - Think Tank Knowledge Cafes Process 360- Think Tank Presentation Capture – Quindi Meeting Support- Wikis
Organizational Learning	Case Studies-Portal-based

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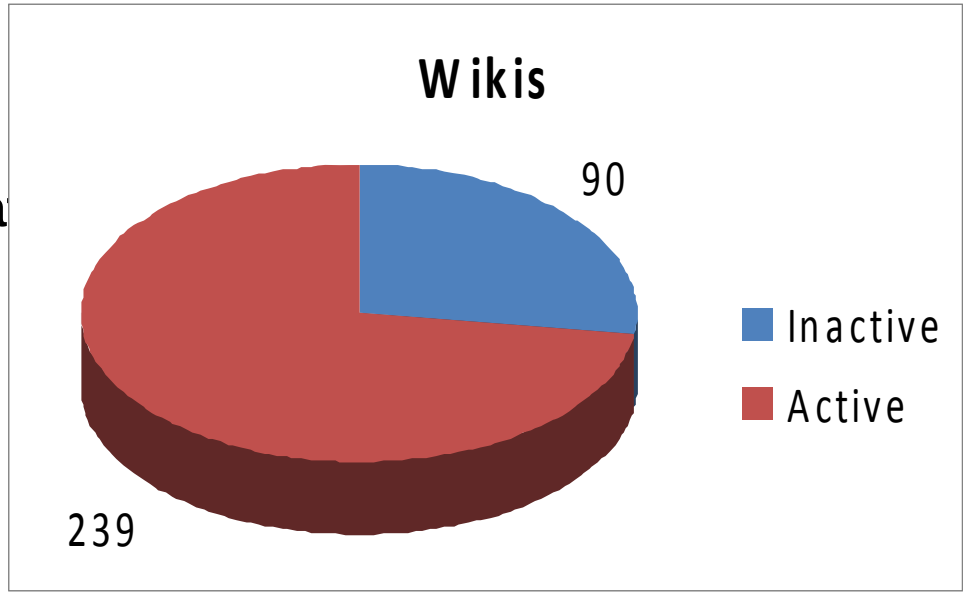
WIKI Emergence

- Easy to Use
- Autonomy (Do it Your Way)
  – Limited (or no) dependency on IT support programmers
  – Self maintenance of content
- Secure
- Intuitive Hierarchy Structure – with flexibility to link anywhere
- Self documenting record of changes
- Enables fully connected trail of bread crumbs from upper level pages to supporting data and information
- Flexible Permissioning (As Open or As Secure as Desired)
- Enables Asynchronous Collaboration
- Fun – Creative Pallet for Enabling Work

ESMD Wiki Statistics

- **Since the inception of the ICE Wiki it has grown to over 4,000 active users.**
- **There are 329 unique Wikis, of which 72% are active.**
- **Inactive status largely reflects the "here is your wiki" deployment of ESMD wikis (see Lessons Learned and Tips at end of presentation)**
- **Implementation challenges remain to broaden participa and utilization**



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Wiki Implementation Example #1

Implementing Program Management & Systems Engineering

Wiki's are the "Cog" that holds it all together '

……. Sheila Nash-Stevenson

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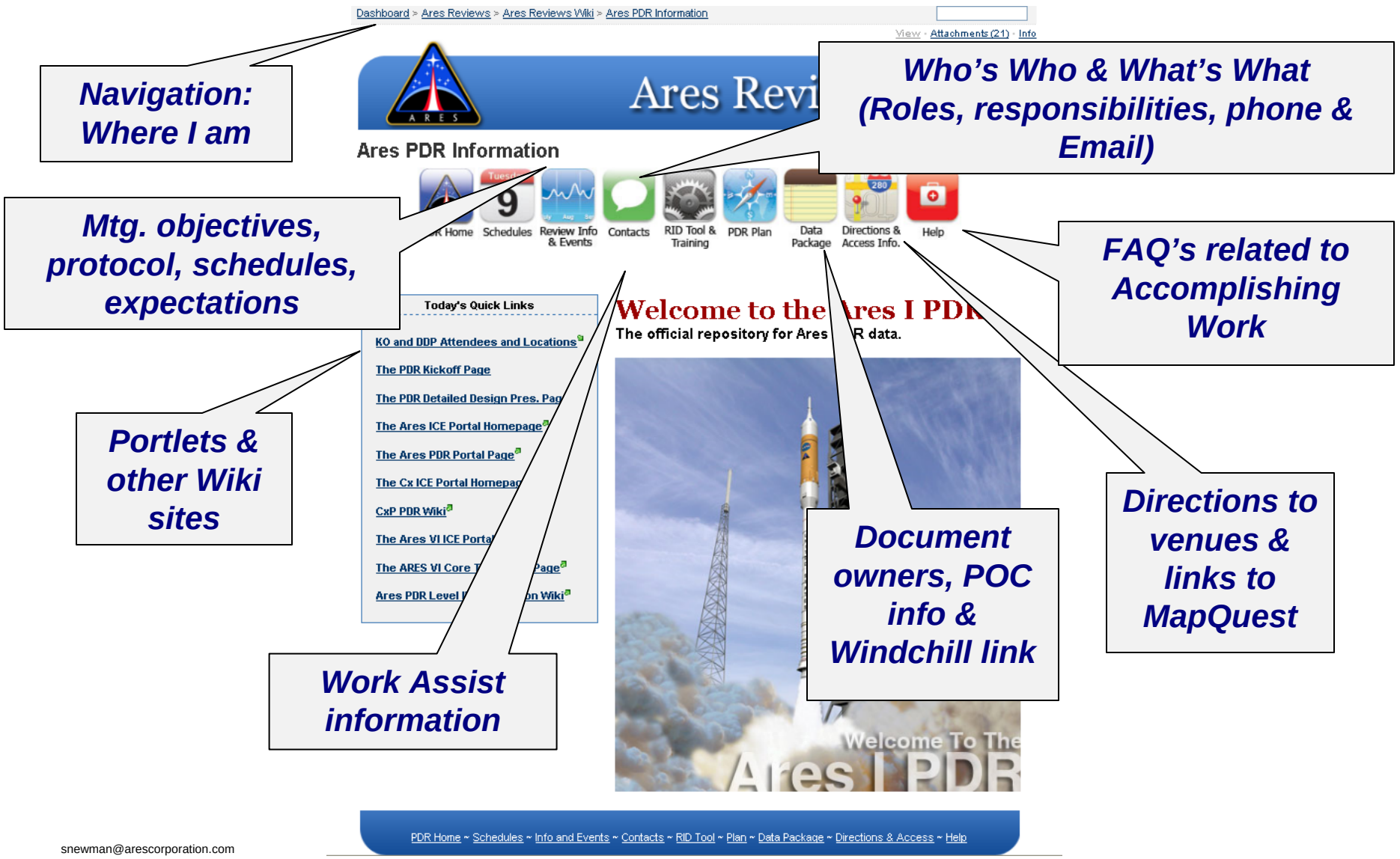
Customized Graphical Features



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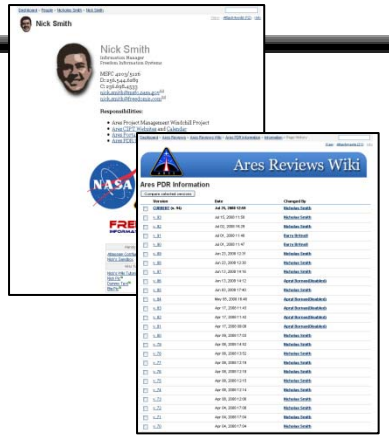
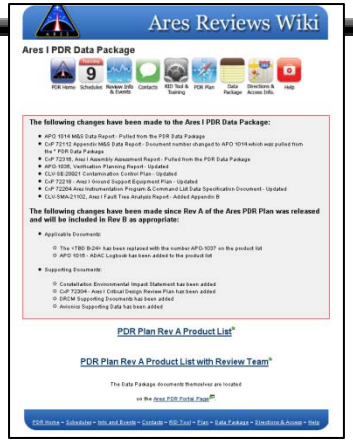


Social Networking Dimension

"Facebooking"

Ability to see who updated and what's going on

Network with people who have same issues as you



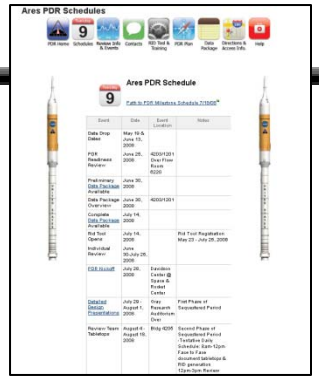
PDR Data Package Page

Product List

Product List and Review Team

Document, Document Title, WBS, MSFC, POC Phone

Easily updateable



PDR Schedule

Links to appropriate documentation include:

Data package for each review point

Notes / logistics / audio files of meetings

Milestone schedule in PowerPoint

PDR Activities Page

Allows The user to view the PDR reviews, wikis, boards, and other information

Centralized location

Easily updated

Completely detailed

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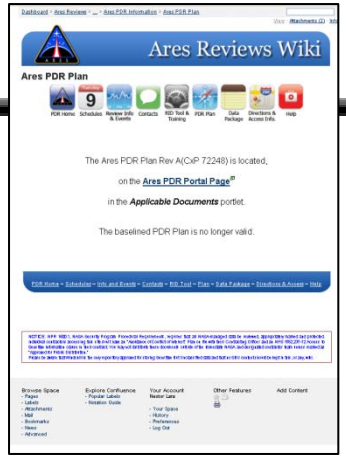
PDR Point of Contact Page

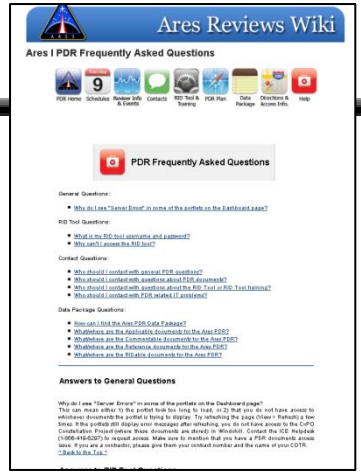
- List of members and their contact information
- Responsibilities of team members
- Whom to contact for a particular reason

RID Tool & Training Page

- Full information regarding meetings
- WebEx links
- Teleconference numbers
- "Questions?" link
- RID and PRID tools readily available



PDR Plan Page



PDR Help Page

- Links to FAQ's on how to accomplish work
- Able to contact the administrator for web-related questions

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ARES-1 PDR Wiki Case Summary

- Great example of wiki as “user friendly “front end” to Windchill
- Excellent graphical design
- Bottoms-up implementation
- Others using as a benchmark
- Exemplifies: Wiki as Work Hub / Wiki as social network / Wiki as integrator / Wiki as front-end to more cumbersome data repository / Wiki as configuration manager for accomplishment of work process / Wiki as mentor (how-to)

Wiki Implementation Example #2

IRKM Program
Risk Management Support

The Risk Wizard

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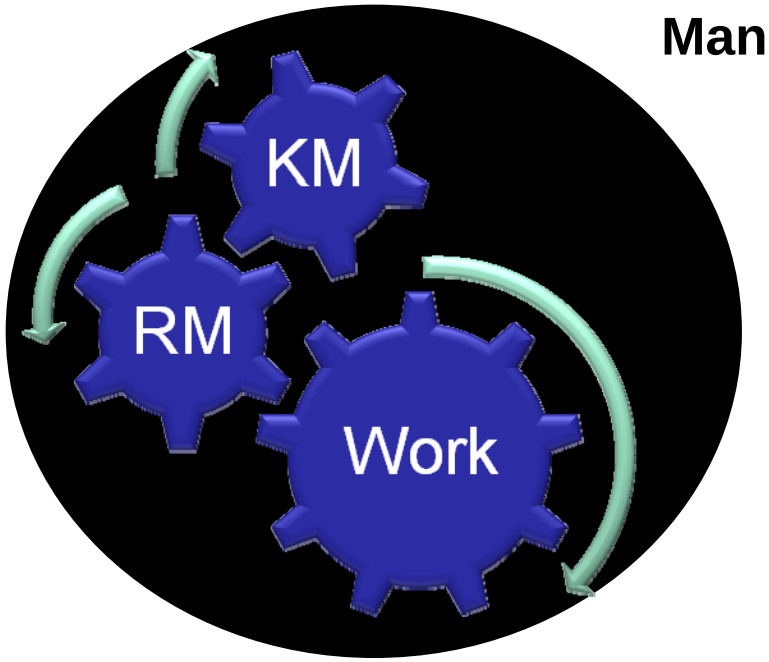
RM & KM - Mutually Interacting Processes Enabling Work

Knowledge Management



Risk Management

Main Engine

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RISK WIZARD ELEMENTS

… planned graphic links from ARM, IRMA, Windchill and ICE Portal pages

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RISK ASSIST WIKI

ESMD Risk Wizard

ESMD Risk Wizard - Introduction

This Wiki-space is intended to assist ESMD programs, projects, managers, and workers in implementing life-cycle risk management practices and discipline. The ***Risk Wizard*** "50,000 foot goals" include helping ESMD to:

- Work more effectively and efficiently
- Make better, more risk, informed decisions
- Achieve program/project/mission success
- Embed safety in all phases of the project life-cycle activities (from concept through disposal)

The Wizard incorporates three distinct (at times overlapping) sets of knowledge resources.

- The Risk Identification (RID) wiki does just that - rich resources abound to help you zero-in on the key risks within your activity.
- The second element, the Risk Assessment & Tools Wiki is there to provide ideas, techniques, and methods useful in determining the root cause and analyzing candidate risks.
- The third element, the Risk Assist Node (RAN) provides detailed insight useful in developing Risk Mitigation and Control Plans (Risk Burndown Plans) for selected Risk categories and classes of risk.

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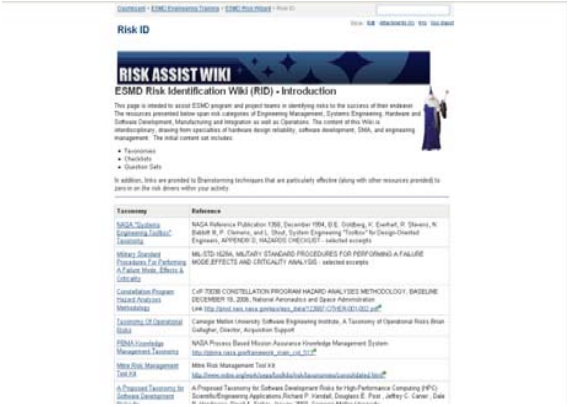
3-Part Risk Wizard

- **Risk Identification (RID) Wiki**
  - Identify risks

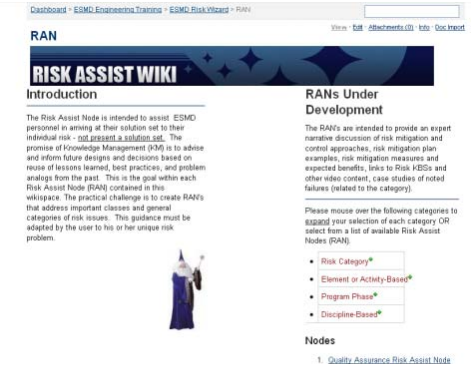


- Provides Help in Identifying Various Kinds of Risks
  - Multi-discipline Subject Matter Expert Brainstorming
    - ThinkTank Assist
  - Structured logic techniques
    - System Safety Hazards Analysis
    - Design Reliability FMEA
  - Taxonomies
  - Checklists
  - Question Sets
  - Past Failure Case Studies

- **Risk Assessment Tool (RAT) Wiki**
  - Assessment methodologies, tools and techniques

- Provides tools and techniques useful in all phases of risk management
- Qualitative and Quantitative analysis techniques
- Problem Solving Approaches
- Process Improvement Methods

- **Risk Assist Nodes (RAN) Wiki**
  - Develop risk mitigation and management plans



- Supports development of risk mitigation plans for selected classes and categories of risk
- Provides best practices and guidance for life-cycle management of risks within class or category

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Wizard Application Summary

- Enables recursive risk management process
- Uses highly flexible wiki architecture
- Enables Asynchronous Web-Based Collaboration
- Rapid development
- Easy update
- Engages “coalition of the willing” – Defense Acquisition University (DAU), Aerospace Corporation, Mitre Corporation, John Hopkins, Applied Physics Laboratory
- Engages “Big Brain” subject matter experts in group authoring of RAN narrative
- Developed without need for extensive programming support
- Rich content / Aggregates methods, tools and techniques for identification and analysis
- Integrates, focuses, and presents organizational memory and experience (past successes and failures) through KBRs and supporting documentation to assist in solving today’s problems
- Exemplifies: Wiki as portal / Wiki as group authoring platform / Wiki as work support Hub / Wiki as social network

Implementation Example 3: Future Application Concept - Risk-Net Wiki

- NASA ESMD accomplishes this task through a network of embedded:
  - Risk Managers
  - Risk Management Data Base Tool Suites
  - Risk Management Working Groups
  - Risk Review Boards
  - Risk Assessment Boards
  - Risk Management Panels
  - Program Control Boards
  - Program Review Boards

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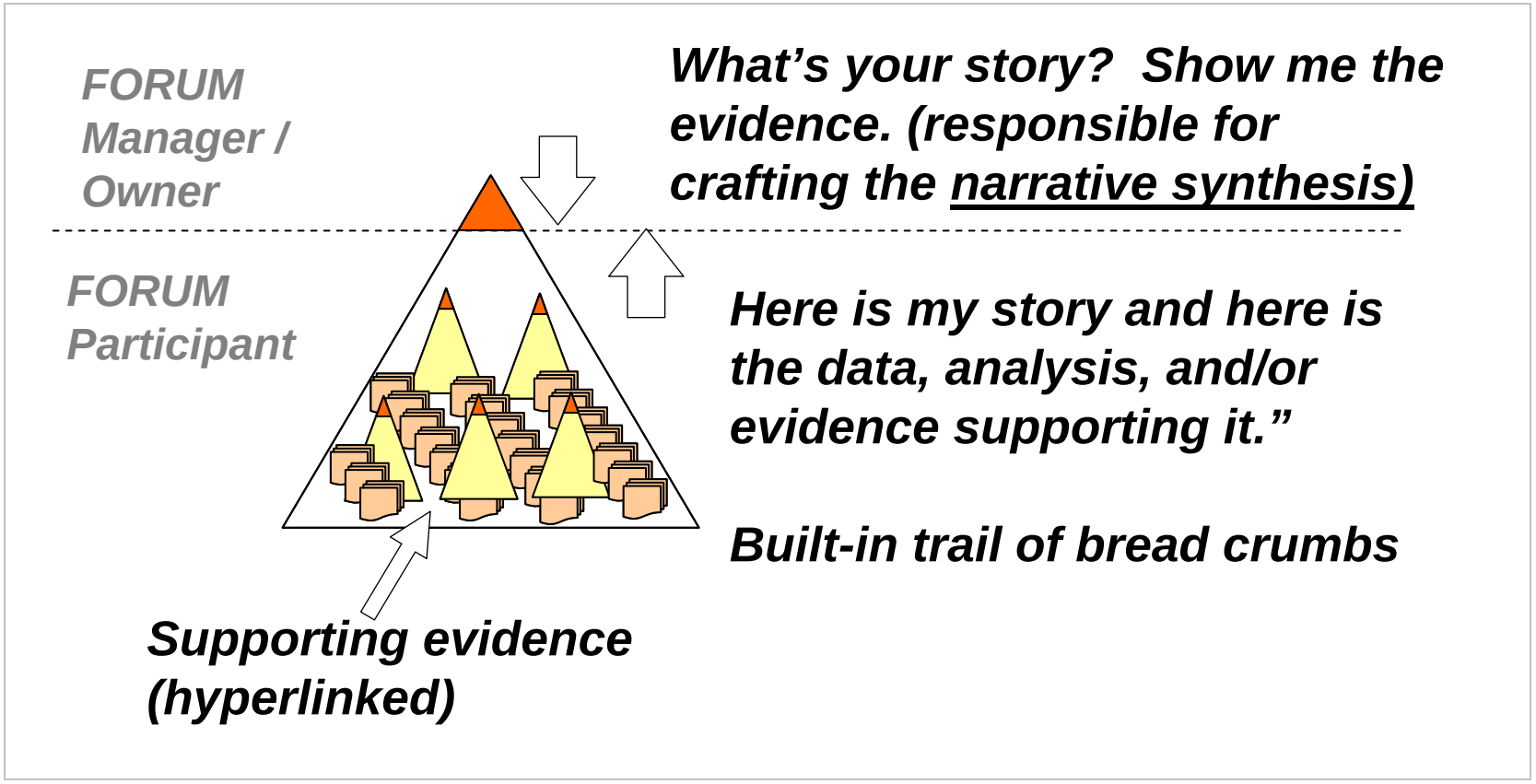
Wiki Future Evolution Concepts

Risk-Net Wiki

Wiki Forum Rules – Match Typical Space Agency Forum Rules



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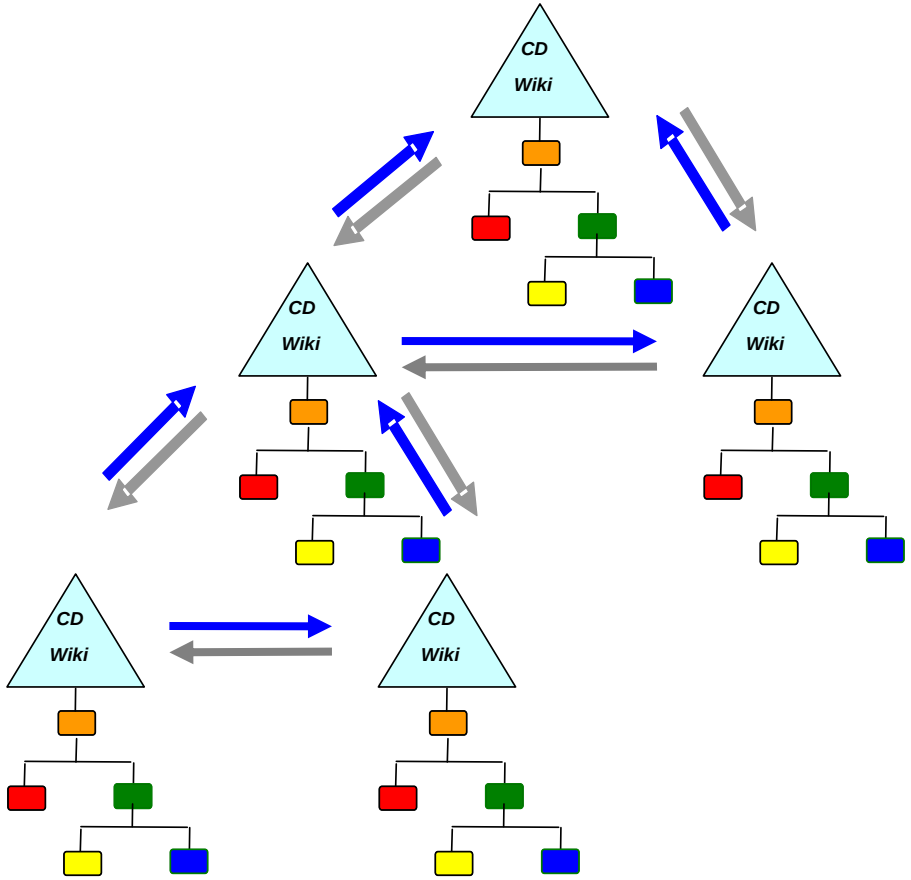
RiskNet Wiki

- A hypothetical ESMD "*RiskNet*" Wiki would be comprised of organizational element nodes (organization Wiki's) and risk integration nodes, (Wiki's at successive tiers in the elevation process). This construct would enable risk posture visibility across the organization, accomplishing both vertical and horizontal integration through mutual access to both element and integration nodes.

- Traditional hierarchal organizations can maintain accountability while leveraging a broader corporate knowledge-base in critical decision making.



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Future Benefits
Risk-Net Wiki Application Summary

- Concept will drive the narrative synthesis of complex risk issues into a holistic picture with a bottom line.

- CD Wiki implementation will:
  - sharpen the argument of forum presenters and the thinking of all participants
  - provide instantaneous drill-down to the supporting evidence, providing a complete and integrated package rather than a fragmented story.

- Enable asynchronous collaboration – allowing thinking and broad opinion "to "brew," iterate, and improve with input and ideas from a diverse cross-stovepipe set of experts afforded access to the decision forum.

- Create a complete historical record of decision, documenting all changes in position and, in the case of failures, provides a pre-assembled and organized package of decisions, decision rationale, and supporting data for mishap review teams.

- Broadens participation leveraging corporate knowledge

- Provides increased but managed visibility and transparency

- Supports better decisions

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Web-Based Collaboration Support

Get Started Here

- ICE/Wiki https://ice.exploration.nasa.gov/

ICE > Applications > Wiki

- PBMA http://pbma.nasa.gov

PBMA > Work Groups > Enhanced Security Work Groups

Need Help?

ESMD Risk & Knowledge Management Officer

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Implementation Support Team

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- *Barry Britnell (256-721-6399) Barry.Britnell@FreedomIS.com*

Wiki Implementation Lessons Learned & Tips

A Compact Startup Guide for Virtual Collaborative Teams

1. Establish Team Founder
2. Define Core Team Members
2. Founder and Core Team Develop Charter
3. Define the Players – Build the Team:
   - Customers and/or stakeholders
5. Establish a "Knowledge Architecture (folders in a CoP environment - Spaces and Link Chains in a Wiki) / Examples include: 1) Issue-based, 2) Work Breakdown Structure-based, 3) Events-based, 4) Function-based.
6. Manage / Evolve Content: Populate / refresh / manage knowledge artifacts within the taxonomy. Implement meta-tags within the CoP or Wiki-space to enable search within the fire-walled domain
7. Implement Critical Links to documents and other web-based resources
8. Manage and mentor social networking dimensions Critically assess participation, evolution, demographics. Encourage members to provide resumes)
9. Employ Task Management Functionality (as necessary or appropriate)
10. Conduct Polls (especially in CoP environment – a powerful tool)
11. Conduct Bi-Weekly Teleconferences (minimum)
12. Conduct Quarterly face-to-face meetings (minimum)
13. Evaluate/measure team progress – Develop Metrics

Connect & Discover

Just do it !